

AMENDMENTS TO THE CLAIMS

(with complete listing)

1. (Currently amended) A method for coupling a riser or umbilical to a floating tension leg platform having a submerged hull with a keel, first and second vertical columns each having a lower end carried by said hull below the waterline and an upper end disposed above the waterline, and a deck rigidly carried by said upper ends of said first and second columns, the hull characterized by having a horizontal perimeter defining first and second extremities, the method comprising the steps of,

providing a first tendon porch mounted to [[on]] said hull at said first extremity below the waterline, of said tension leg platform,

providing a second tendon porch mounted to said hull at said second extremity below the waterline,

anchoring connecting a lower end of a first vertically oriented mooring tendon to a sea bed, [[and]]

connecting an upper end of said first mooring tendon to said first tendon porch to moor said tension leg platform, said first tendon being non-compliantly fixed to said hull
predominantly vertically oriented and under tension so as to vertically restrain said tension leg platform,

anchoring a lower end of a second mooring tendon to said sea bed,

connecting an upper end of said second tendon to said second tendon porch to moor said tension leg platform, said second tendon being non-compliantly fixed to said hull and under tension so as to vertically restrain said tension leg platform,

coupling the lower end of each of a plurality of tubular members to at least one subsea well so that the interior of each of said plurality of tubular members is in fluid communication with said at least one subsea well,

longitudinally suspending the upper end of each of said plurality of tubular members from ~~an upper elevation above said hull~~ said deck by at least one passive resilient tensioner,

allowing by said at least one passive resilient tensioner vertical movement of said each of said plurality of tubular members with respect to said tension leg platform to compensate for lateral displacement of said tension leg platform, and

laterally supporting each of said plurality of tubular members at a lower elevation at said hull such that each of said plurality of tubular members borders said hull, said lower elevation fixed with respect to said hull.

2. (Previously presented) The method of claim 1 further comprising the step of, laterally supporting a first of said plurality of tubular members below the waterline.
3. (Previously presented) The method of claim 1 further comprising the step of, laterally supporting a first of said plurality of tubular members at an elevation generally corresponding to the elevation of said keel.
4. (Previously presented) The method of claim 1 further comprising the step of, laterally supporting a first of said plurality of tubular members at an outboard-facing surface of said hull.
5. (Previously presented) The method of claim 1 further comprising the step of, laterally supporting a first of said plurality of tubular members at an inboard-facing surface of said hull.
6. (Previously presented) The method of claim 1 further comprising the step of,

laterally supporting a first of said plurality of tubular members at a surface of a moonpool in said hull.

7. (Currently amended) The method of claim 1 further comprising the steps of, receiving a portion of a first of said plurality of tubular members in a bearing assembly fixed to said hull at said lower ~~second~~ elevation,

laterally supporting said first tubular member by said bearing assembly, and allowing longitudinal movement of said first tubular member relative to said bearing assembly.

8. (Cancelled)

9. (Previously presented) The method of claim 7 further comprising the step of, allowing side entry of said first tubular member into said bearing assembly.

10. (Previously presented) The method of claim 7 further comprising the step of, allowing vertical entry of said first tubular member into said bearing assembly.

11. (Cancelled)

12. (Previously presented) The method of claim 1 further comprising the step of, suspending a first of said plurality of tubular members at a generally vertical orientation.

13. (Cancelled)

14. (Previously presented) The method of claim 1 further comprising the step of, suspending a first of said plurality of tubular members by a spring.

15. (Cancelled)

16. (Previously presented) The method of claim 1 further comprising the steps of, receiving a first of said plurality of tubular members in a vertical passage formed through said hull, and

laterally supporting said first tubular member in said vertical passage.

17-22. (Cancelled)

23. (Currently amended) A floating tension leg platform comprising,

a submerged buoyant hull having a keel, the hull characterized by having a horizontal perimeter defining first and second extremities,

[[a]]first and second columns each having a lower end carried by ~~coupled to~~ said hull below the waterline and an upper end, ~~said column extending~~ above the waterline,

a deck rigidly carried by said ~~coupled to an~~ upper ends of said first and second columns,

a first tendon porch mounted to said hull at said first extremity below the waterline,

a second tendon porch mounted to said hull at said second extremity below the waterline,

a first vertically-oriented mooring tendon having an upper end fixed ~~connected to~~ said first tendon porch ~~hull~~ and a lower end anchored ~~coupled to~~ the seabed,

a second vertically-oriented mooring tendon having an upper end fixed to said second tendon porch and a lower end anchored to the seabed,

a bearing assembly having a vertically oriented generally cylindrical passage therein and fixed to and bordering an exterior surface of said hull,

~~a tensioner connected to said floating tension leg platform and disposed at an elevation above said hull, and~~

a tubular member having a lower end coupled to a subsea well so that an interior of said tubular member is in fluid communication with said subsea well, said tubular member having an upper end longitudinally suspended ~~[[by]]~~ at said deck, tensioner, said tubular member vertically movably disposed ~~passing~~ within said passage of said bearing assembly and laterally supported by said bearing assembly, and

a passive resilient tensioner carried by said deck at an elevation above said waterline, said tensioner arranged for suspending said tubular member from said deck and for allowing vertical movement between said deck and said tubular member.

24. (Cancelled)

25. (Currently amended) The floating tension leg platform of claim 23 wherein, said tubular member is predominantly vertically oriented ~~and tensioned by said buoyant hull.~~

26-29. (Cancelled)

30. (Previously presented) The floating tension leg platform of claim 23 wherein, said bearing assembly includes a longitudinal slot which communicates with said passage and which is designed and arranged to allow side entry of said tubular member.

31. (Previously presented) The floating tension leg platform of claim 23 wherein, said bearing assembly is disposed at an elevation generally corresponding to the elevation of said keel.

32. (Previously presented) The floating tension leg platform of claim 23 wherein, said bearing assembly is disposed at an elevation generally corresponding to the elevation of said upper end of said mooring device.

33-35. (Cancelled)

36. (Currently amended) The [[A]] floating tension leg platform of claim 23 wherein,
comprising,

a submerged buoyant hull having a keel,

a column having a lower end coupled to said hull, said column extending above the waterline,

~~a deck coupled to an upper end of said column,~~
~~a mooring tendon having an upper end coupled to said hull and a lower end coupled to~~
~~the seabed,~~
~~said bearing assembly includes an first and second apertures each being~~ vertically formed
 through said hull and having a closed vertical periphery throughout the extent of said aperture
 through said hull. [[,]]
~~first and second tensioners each coupled to said floating body tension leg platform and~~
~~disposed at an elevation above said hull,~~
~~a first tubular member having a lower end in fluid communication with a subsea well and~~
~~an upper end suspended by said first tensioner, said first tubular member passing within said first~~
~~aperture, and~~
~~a second tubular member having a lower end in fluid communication with a subsea well~~
~~and an upper end suspended by said second tensioner, said second tubular member passing~~
~~within said second aperture.~~

37-44. (Cancelled)

45. (Previously presented) The floating tension leg platform of claim 23 wherein,
said bearing assembly is disposed at an outboard-facing surface of said hull.
46. (Previously presented) The floating tension leg platform of claim 23 wherein,
said bearing assembly is disposed at an inboard-facing surface of said hull.
47. (Previously presented) The floating tension leg platform of claim 23 wherein,
said bearing assembly is disposed in a moonpool in said hull.
48. (New) The floating tension leg platform of claim 23 wherein,
said bearing assembly is disposed at a bottom-facing surface of said hull.

49. (New) The floating tension leg platform of claim 23 wherein, said hull is characterized by a noncircular horizontal perimeter.
50. (New) The floating tension leg platform of claim 23 wherein, said tubular member is disposed medially of said first and second mooring tendons.
51. (New) The method of claim 1 further comprising the step of, locating said tubular member medially of said first and second tendons.
52. (New) In a tension leg platform having a submerged hull defining a keel, two or more vertical columns each having a lower end carried by the hull below the waterline and an upper end disposed above the waterline, a deck rigidly carried by the upper ends of the two or more vertical columns, a first tendon porch connected to a first extremity of the hull at an elevation of the keel below the waterline, a second tendon porch connected to a second extremity of the hull at an elevation of the keel below the waterline, a first vertically oriented tendon having an upper end fixed to and terminating at said first tendon porch and a lower end anchored to the seafloor, a second vertically oriented tendon having an upper end fixed to and terminating at said second tendon porch and a lower end anchored to the seafloor, and a vertically oriented production riser disposed medially of said first and second tendons and having a lower end connected to the seafloor, an interior fluidly coupled to a subsea well and an upper end carried by the tension leg platform, the improvement comprising:

a keel guide rigidly connected to the periphery of the hull at the elevation of the keel below the waterline, the keel guide defining a vertical aperture therethrough, a mid-portion of the vertically oriented production riser longitudinally movably captured by said aperture and laterally supported by the keel guide; and

a passive resilient tensioner carried by the deck at an elevation above the waterline, the upper end of said vertically oriented production riser connected to and vertically supported by said passive resilient tensioner such that said upper end of said vertically oriented production riser moves vertically with respect to said deck as said tension leg platform is horizontally displaced.

53. (New) The tension leg platform of claim 52 wherein,

said passive resilient tensioner is a spring.

54. (New) In a method for coupling a production riser having an upper end and a lower end to a tension leg platform, the tension leg platform characterized by a submerged hull that defines a keel and first and second extremities, two or more vertical columns each having a lower end carried by the hull below the waterline and an upper end disposed above the waterline, a deck rigidly carried by the upper ends of the two or more vertical columns, and first and second tendon porches connected to the first and second extremities of the hull, respectively, at an elevation of the keel below the waterline, the method including the steps of disposing first and second vertically oriented mooring tendons having upper and lower ends between the tension leg platform and the seafloor, fixing the upper ends of the first and second vertically oriented mooring tendons to the first and second tendon porches, respectively, below the waterline, anchoring the lower ends of the first and second vertically oriented mooring tendons to the seafloor, vertically orienting the production riser between the tension leg platform and the seafloor, connecting the lower end of the production riser to the seafloor, fluidly coupling the interior of the production riser to a subsea well, and suspending the upper end of the production riser from the tension leg platform, the improvement comprising the steps of:

rigidly coupling a keel guide that forms a vertical aperture therethrough to the hull at the elevation of the keel below the waterline;

longitudinally movably capturing a mid-portion of the production riser in the aperture;

laterally supporting the production riser by the keel guide;

disposing a passive resilient tensioner on the deck;

connecting the upper end of the production riser to the passive resilient tensioner;

vertically supporting the production riser by the passive resilient tensioner; and

allowing by the passive resilient tensioner the upper end of the production riser to move vertically with respect to the deck as the tension leg platform moves horizontally over said seafloor.